

DEC 11 2007

Application No.: 10/727,900

Docket No.: 123034-05004744

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1-6. (Cancelled)

7. (Currently Amended) A method for manufacturing an organic molecular device comprising the steps of:

a) providing a substrate of a resistive insulating material having an insulating layer formed on an upper surface and forming a lower electrode on the insulating layer ~~upper surface of the substrate~~;

b) forming a predetermined size of a sacrificial layer pattern on an entire upper surface of the substrate including the lower electrode and the insulating layer;

c) using a photo etching technique to remove a portion of the sacrificial layer excluding a predetermined area covering the lower electrode so that the sacrificial layer surrounds the lower electrode;

d) covering the entire remaining surface from step c including the sacrificial layer surrounding the lower electrode with a polymer and forming a polymer pattern with a line width of 50nm by an electron beam etching technique to expose the sacrificial layer and the substrate on which the lower electrode is formed;

e) forming an upper electrode by depositing metal on an entire upper surface from step d and removing metal on the polymer pattern by a lift-off process so that an upper electrode is formed and on the sacrificial layer ~~surrounds~~ surrounding the lower electrode and is on an exposed portion of the insulator;

f) removing the sacrificial layer so that a nanogap is formed between the upper electrode and the lower electrode; and

Application No.: 10/727,900

Docket No.: 123034-05004744

g) adsorbing conductive organic molecules between the upper electrode and the lower electrode;

wherein the sacrificial layer pattern is formed of ~~the~~ an organic material, ~~the~~ an oxide film, ~~or the a metal film, or of a multilayer structure~~ a combination thereof having different etching selection ratios with respect to the insulating layer, and the sacrificial layer pattern being is formed in a nanometer thickness and the nano gap is formed so that vertical and horizontal distances thereof are asymmetric so that the horizontal distance is larger than the vertical distance.

8. (Canceled)

9. (Currently Amended) A method for manufacturing an organic molecular device comprising the steps of:

a) providing a substrate of a resistive insulating material having an insulating layer formed on an upper surface and forming a lower electrode on the insulating layer upper surface of the substrate;

b) forming a predetermined size of a sacrificial layer pattern on an entire upper surface of the substrate including the lower electrode and the insulating layer;

c) using a photo etching technique to remove a portion of the sacrificial layer excluding a predetermined area covering the lower electrode so that the sacrificial layer surrounds the lower electrode;

d) covering the entire remaining surface from step c) including the sacrificial layer surrounding the lower electrode with a polymer and forming a polymer pattern with a line width of 50nm by an electron beam etching technique to expose the sacrificial layer and the substrate on which the lower electrode is formed;

e) forming an upper electrode by depositing metal on an entire upper surface from step d) and removing metal on the polymer pattern by a lift-off process so that an upper electrode is formed and on the sacrificial layer surrounds surrounding the lower electrode and is on an exposed portion of the insulator;

Application No.: 10/727,900**Docket No.: 123034-05004744**

f) removing the sacrificial layer so that a nanogap is formed between the upper electrode and the lower electrode; and

g) adsorbing conductive organic molecules between the upper electrode and the lower electrode; and

wherein the nanogap is formed so that vertical and horizontal distances thereof are asymmetric so that the horizontal distance is larger than the vertical distance and the conductive organic molecules are adsorbed while the substrate is immersed in a solution in which the conductive organic molecules are dissolved.

10. (Original) The method according to claim 9, wherein an electric field is applied between the lower electrode and the upper electrode on the substrate.

11. (Original) The method according to claim 9, wherein the solution is stirred or heated.

12. (Currently Amended) A method for manufacturing an organic molecular device comprising the steps of:

a) providing a substrate of a resistive insulating material having an insulating layer formed on an upper surface and forming a lower electrode on the insulating layer ~~upper surface of the substrate~~;

b) forming a predetermined size of a sacrificial layer pattern on an entire upper surface of the substrate including the lower electrode and the insulating layer;

c) using a photo etching technique to remove a portion of the sacrificial layer excluding a predetermined area covering the lower electrode so that the sacrificial layer surrounds the lower electrode;

d) covering the entire remaining surface from step c) including the sacrificial layer surrounding the lower electrode with a polymer and forming a polymer pattern with a line width of 50nm by an electron beam etching technique to expose the sacrificial layer and the ~~substrate~~ insulating layer on which the lower electrode is formed;

Application No.: 10/727,900**Docket No.: 123034-05004744**

e) forming an upper electrode by depositing metal on an entire upper surface from step d) and removing metal on the polymer pattern by a lift-off process so that an upper electrode is formed ~~and on~~ the sacrificial layer ~~surrounds~~ surrounding the lower electrode and ~~is on an exposed portion of the insulator~~ insulating layer;

f) removing the sacrificial layer so that a nanogap is formed between the upper electrode and the lower electrode; and

g) adsorbing conductive organic molecules between the upper electrode and the lower electrode; ~~and~~

wherein the nanogap is formed so that vertical and horizontal distances thereof are asymmetric so that the horizontal distance is larger than the vertical distance and the conductive organic molecules are adsorbed, a current flowing through the lower electrode and the upper electrode is sensed so that whether and how much to adsorb is observed.

13. (Currently Amended) The method according to claim 12, further comprising a step of passivating an exterior with ~~the an~~ an insulating film after the step (e).

14. (Cancelled)

15. (New) The method according to claim 7, the sacrificial layer is formed of Ti, Pt or Au.

16. (New) The method according to claim 9, the sacrificial layer is formed of Ti, Pt or Au.

17. (New) The method according to claim 12, the sacrificial layer is formed of Ti, Pt or Au.